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(58) Field of search

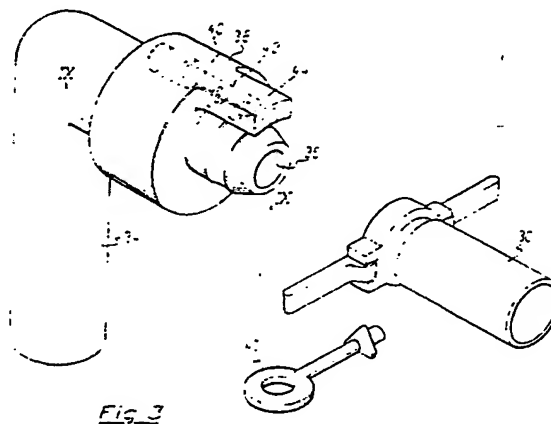
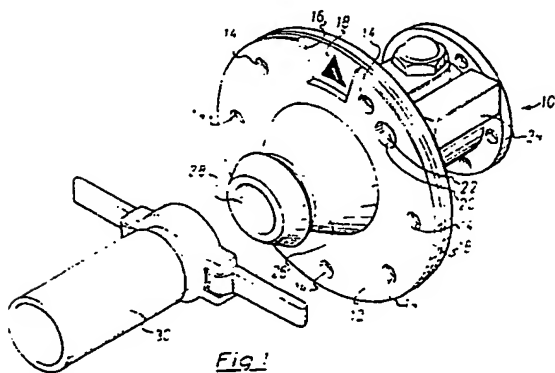
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(54) Liquid discharge selection apparatus

(57) Liquid discharge apparatus, whereby passage of liquid from a source e.g. a fuel tanker to a destination e.g. fuel storage vessel and stand pipe (34) may be prevented when the source is connected to an unsuitable destination having regard to the type of liquid at the source, includes an outlet valve (10) on the liquid source, a pipe (30) connectable to the valve, and a lock (24) which enables the valve (10) to be opened only by presentation to the lock (24) of a key (43) corresponding to a liquid associated with that source and releasable from the destination only in connection of the other end of the pipe thereto. The corresponding key will be inserted through an aperture (20) in a fixed plate (12) and a matching keyway in a rotatable plate (18) to actuate the lock and open the valve. Loading of the source via the valve with a different liquid can only take place when the plate (18) has been rotated so that a pin on the loading means and passing through a respective aperture (14) in the fixed plate can also pass through an aperture in the rotary plate. When this occurs another, different keyway will be aligned with the aperture (20) and the lock.



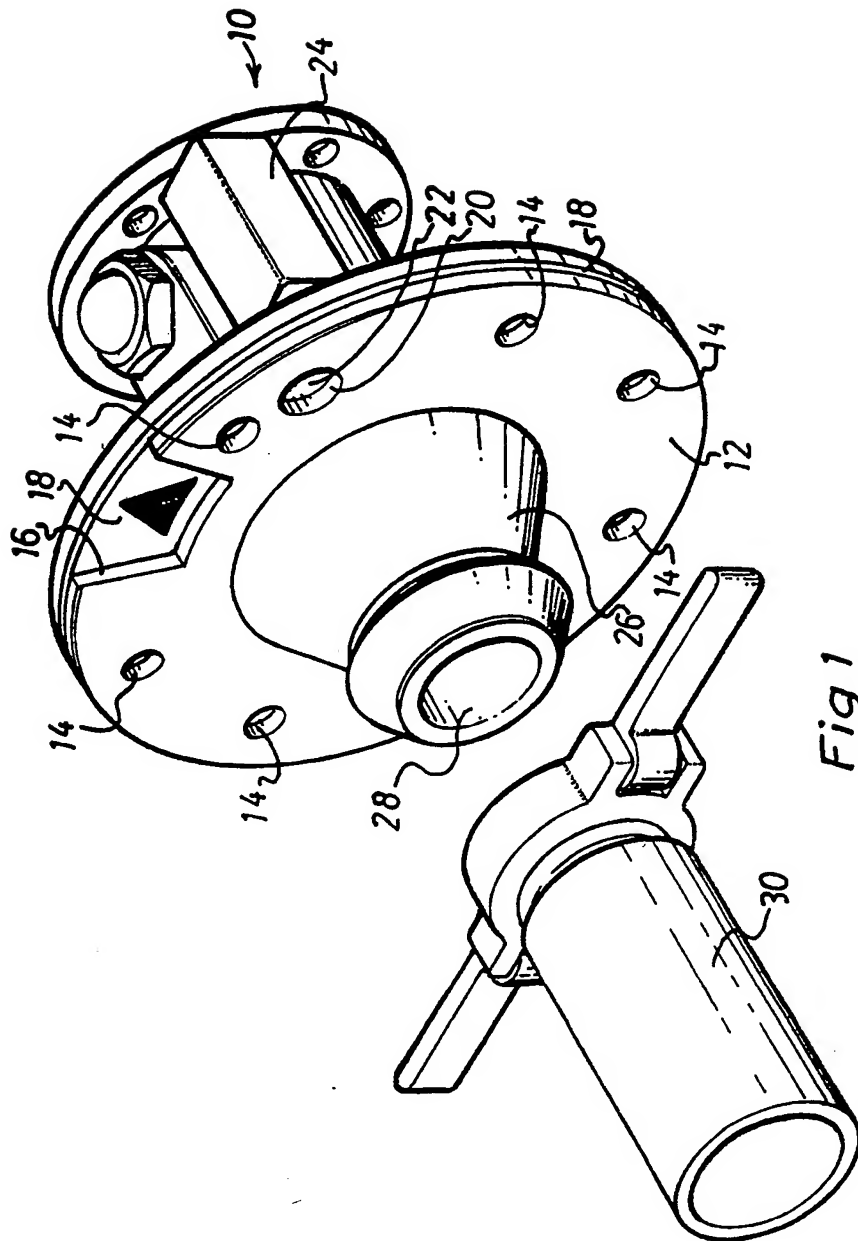


Fig. 1.

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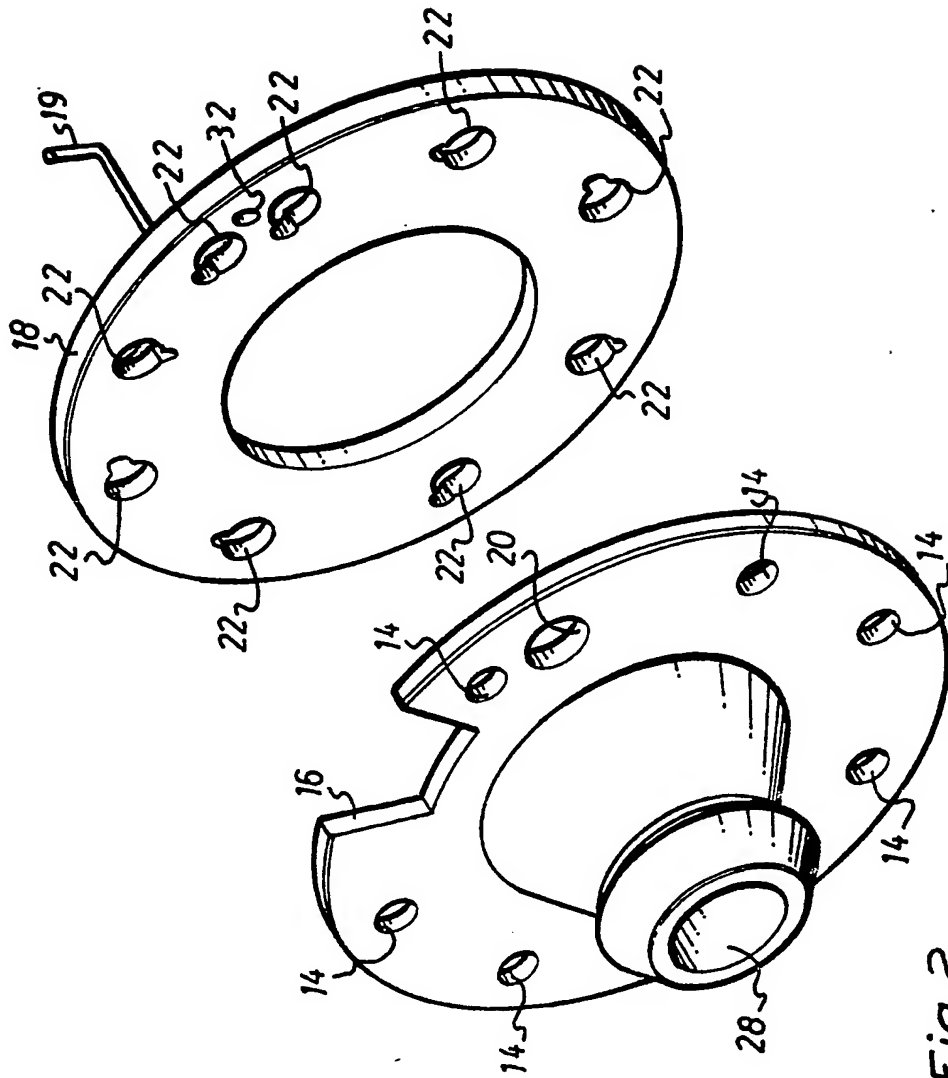


Fig 2

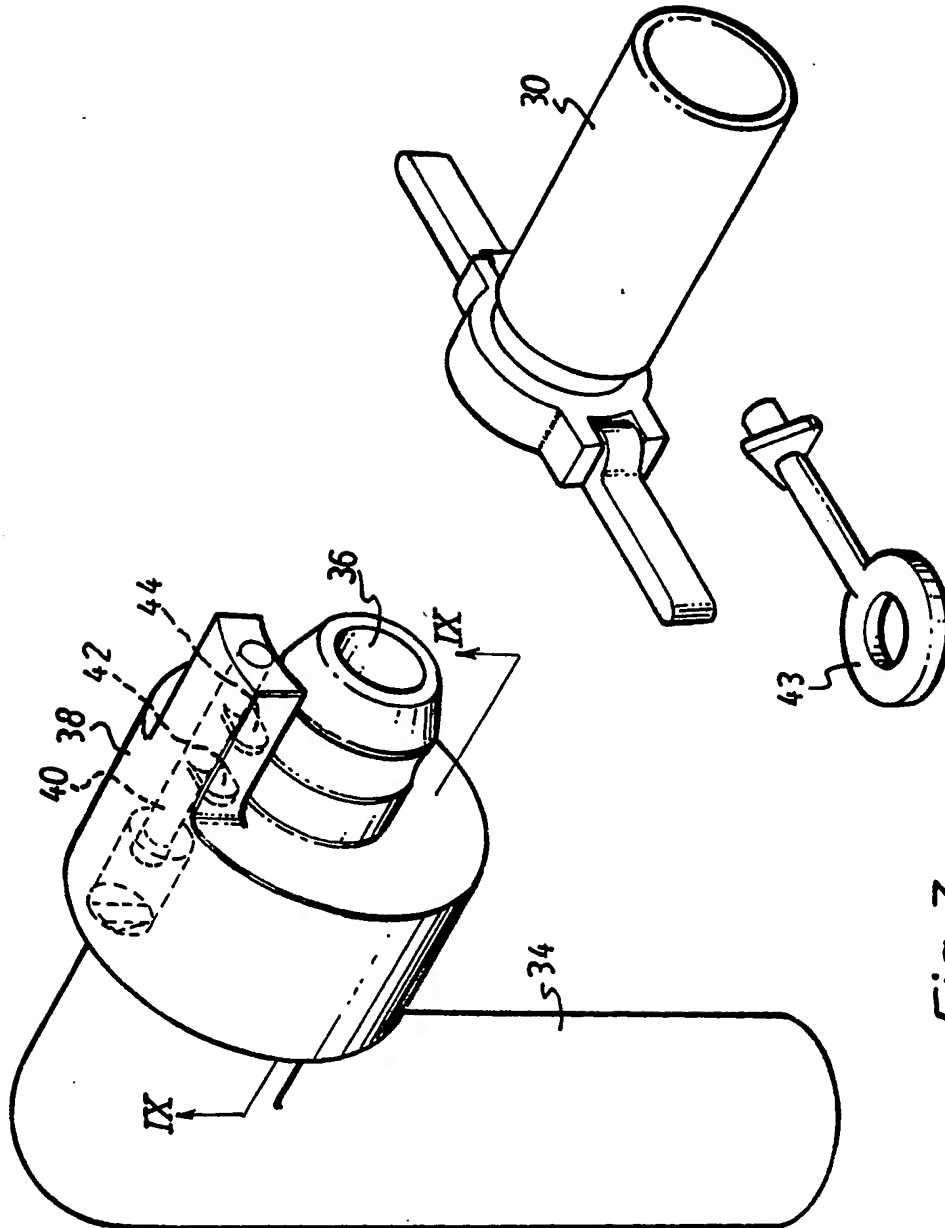


Fig. 3.

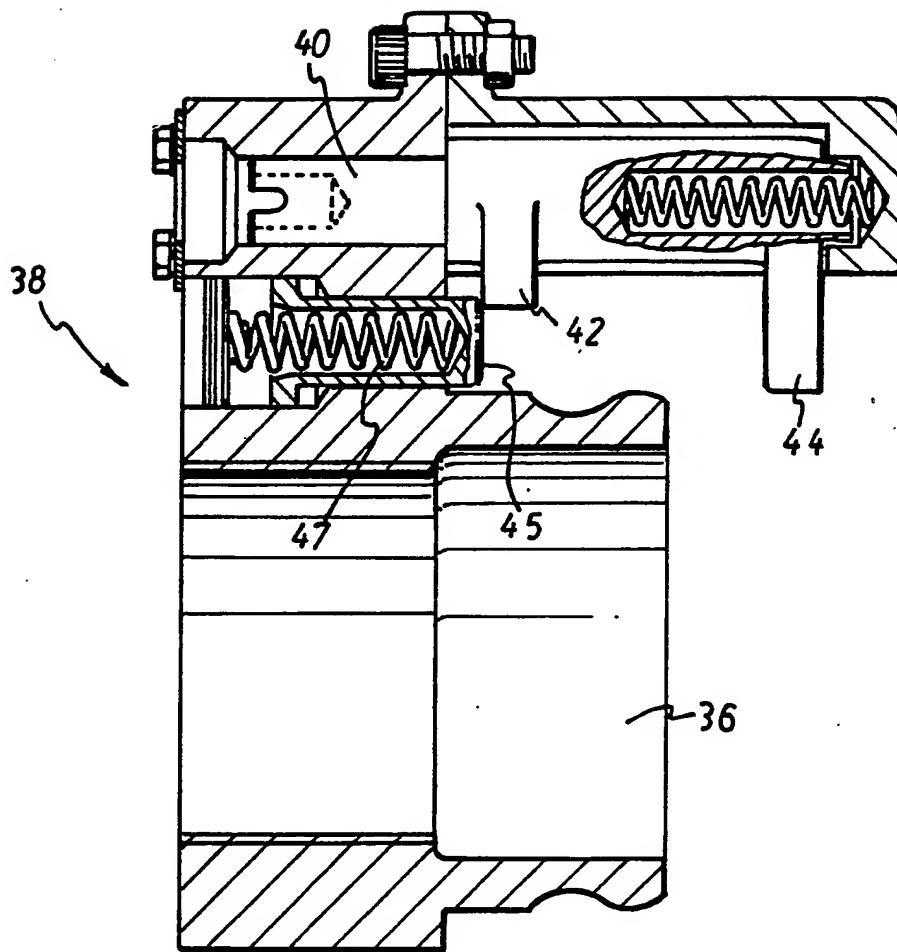


Fig 4.

DESCRIPTION

LIQUID DISCHARGE SELECTION APPARATUS

The present invention relates to liquid discharge apparatus and in particular, but not exclusively, to
5 apparatus for discharging liquids of varying types.

Liquid storage vessels are currently employed to store a particular type of liquid, for example, oil, diesel, one of a variety of types of petrols, aviation fuel or other liquid products such as food products.

10 Since these storage vessels are commonly large and inaccessible, except via the liquid inlet, it is imperative that the correct type of liquid is discharged thereinto. If the wrong type of liquid is discharged into a storage vessel, this may lead to
15 great expense to those responsible, particularly when costs of any legal action which may ensue are considered. In addition, if this mistake goes undetected, extremely hazardous conditions may exist wherein food products may become contaminated or types
20 of fuel such as aviation fuel and diesel or petrol may be mixed or even eventually discharged into a vehicle or aircraft not suited to such fuel.

Since storage tanks requiring different types of liquid are commonly disposed in the same locality and
25 the inlet stand-pipes associated therewith are thus also proximate one another, liquid product may often be

discharged into the wrong storage vessel resulting in the consequences outlined hereinbefore. The actions of the operator, who has to connect the various flow pipes to the storage vessel inlet, determine whether the
5 correct connection is made and thus the correct liquid is discharged into the correct storage vessel.

The possibility of a connection error occurring is increased when liquid is discharged into the storage vessel from a multi-compartment transport tanker. Such
10 tankers have a plurality of outlet valves, each one corresponding to a separate tanker compartment. The use of each of these tanker compartments is not permanently restricted to only one type of liquid product and may be used for different products on different delivery
15 journeys. The vehicle driver is then responsible for connecting the correct vehicle compartment to the correct liquid storage vessel, and due to the permutation of connections that could feasibly be made, the possibility of an error occurring is increased.

20 It would therefore be advantageous if apparatus could be provide which decreases, and preferably eliminates, the possibility of such manual operator errors occurring.

In accordance with the present invention there is
25 provided liquid discharge selection apparatus comprising

means for selectively controlling the passage of liquid from a source to a destination, which means is associated with a destination peculiar to one type of liquid, whereby the passage of the liquid may be prevented when the source is connected to an unsuitable destination having regard to the type of liquid at the source.

Preferably, the means is adjusted having regard to the type of liquid at the source. This adjustment may advantageously be made simultaneously as the corresponding particular type of liquid is supplied to the source.

Preferably, the means may only be operated once a connection is made between the liquid source and destination and then only once the correct source is connected to the correct destination, having regard to the type of liquid to be discharged.

The liquid source advantageously comprises a valve, through which the liquid is discharged as required, which valve is advantageously opened and closed by a lock means and corresponding activator means.

Preferably, the activator means is located at the destination and may not be connected to the lock means, so as to open the valve, until the correct source is connected to the correct destination having regard to

the liquid to be discharged therein.

Preferably, different lock means are provided having regard to different types of fluid, each of which lock means may only be accessed when a corresponding liquid is at the source.

Advantageously, the activator means which is unique to the lock means corresponding to one type of liquid, comprises a key means which is locked at the destination and may not be removed therefrom until the source is connected to the destination. As the key is moved so as to open the lock means it advantageously remains secured to the hose or pipeline making the connection between source and destination. Since this lock means for selectively controlling the passage of liquid has advantageously been "set", on supplying the liquid source, so as to be opened only by the appropriate key or activating means which is located only at a destination corresponding to the liquid to be discharged from the course, the possibility of discharging a type of liquid in to the wrong destination storage vessel is eliminated.

The invention is described further hereinafter, by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a perspective view of one embodiment of

valve apparatus in accordance with the present invention, which may be fitted to a tanker compartment;

Fig. 2 is a exploded view of parts of the apparatus of Fig. 1;

5 Fig. 3 is a perspective view of one embodiment of inlet apparatus in accordance with the present invention, which may be fitted to the destination of the fluid discharged through the valve of Fig. 1; and

10 Fig. 4 is a longitudinal cross section through line IX-IX of Fig. 3.

The valve 10 of Fig. 1 is illustrated adjacent a hose 30 which, as required, fits onto a flanged conical connecting piece 26 so as to direct liquid, flowing through the central bore 28 of the valve, to its destination. A fuel tanker compartment (not shown) is contiguous with the valve 10 so that fuel may be supplied thereto and discharged therefrom. The type of fuel, for example aviation or diesel fuel, contained in the tanker compartment is indicated by a fuel type indicator 18, illustrated in Fig. 1 as a triangle.

20 The valve 10 is fitted with two adjacently disposed annular plates 12, 18, one 18 of which is rotatable in either a clockwise or anticlockwise direction about its axis. The plate 12 has eight locating holes 14 uniformly disposed around the circular surface thereof

25

and which pass through the full thickness of the plate 12 so as to open onto a surface of the annular plate 18. An enlarged aperture 20 is also provided through the plate 12 and similarly opens onto a surface of the plate 18. The aperture is disposed adjacent a locking mechanism 24 which is employed to selectively lock and unlock the valve 10 so as to allow the passage of fuel therethrough. A sector in the circumferential region of the annular plate 12 is removed so that the fuel type indicator 18 is visible through a slot 16 formed thereby.

Fig. 2 is an exploded view of the two annular plates 12, 18 of Fig. 1. As illustrated, the annular plate 18 has eight apertures 22 located therethrough, each of which is a unique shape so as to only allow a corresponding unique key to pass therethrough, which key has previously passed through the aperture 20 in the annular plate 12. The annular plates 12 and 18 have eight locating holes 14 and eight apertures or key access holes 22 respectively so that the apparatus illustrated may be used to identify and ensure correct delivery of eight different types of fuel. The invention is not restricted to the details of the illustrated embodiment and may be provided with any desired and practical number of locating holes and

apertures in the annular plates 12, 18 respectively.

When the fuel tanker is to be filled with fuel, a loading arm is connected to the valve so as to pass the fuel therethrough. Each loading arm is unique to the type of fuel it delivers to the tanker compartment due to the location of a dowel pin on the part of the loading arm that abuts the front surface of the annular plate 12. The dowel pin will thus fit into only one of the eight locating holes 14 of the annular plate 12, which of the eight depends on the loading arm being used and thus the type of liquid being supplied to the tanker compartment.

On moving the loading arm into connection with the valve 10, the dowel pin of the loading arm passes into its appropriate locating hole, but may be prevented from passing completely therein since it comes into abutment against the surface of the annular plate 18. The loading arm is therefore prevented from being connected to the valve 10. The annular plate 18 is rotated by means of a handle 19 until a locating hole 32 of the annular plate 18 is adjacent the locating hole 14 of the annular plate 12 containing the dowel pin of the loading arm. The dowel pin then passes completely through the appropriate locating hole 14 and into the locating hole 32. The loading arm may now be appropriately connected to the

valve 10. The rotation of the annular plate 18, so as to align the appropriate locating hole 14 with the locating hole 32, also aligns one of the uniquely shaped key access holes 22 with the aperture 20 of the annular plate. Similarly, a fuel product identification symbol, corresponding to the liquid being supplied, is moved into the viewing slot 16. The tanker compartment is supplied with the appropriate liquid and the loading arm is then disconnected from the valve 10. The tanker compartment thus contains liquid, the type of which is identified by means of the identification symbol and the access to which may only be gained by operating the locking mechanism 24 by use of an appropriate unique key which corresponds to the type of liquid in the container and to the key access hole which, during compartment supply, was moved into a location adjacent the aperture 20.

Fig. 3 illustrates part of a stand-pipe 34 associated with a fuel storage vessel, which is to be supplied with fuel from the tanker compartment, and which comprises a locking fixture 38 located at the inlet port 36 of the stand-pipe. The locking fixture 38 comprises a lock 40, unique to one type of liquid and integral with two locking members 42, 44, which lock may be accessed by a unique key 43. The key 43 is locked

within the lock 40 and may only be removed once a hose is connected to the inlet 36. Fig.3 illustrates the key 43 removed from the lock 40 after the hose 30 has been fitted onto the inlet valve 36.

5 Fig.4 is a cross-section through the locking fixture 38 of Fig.3 and further illustrates the locking members 42 and 44. A resilient bolt member 45 prevents the locking member 42 from rotating and so prevents the key 43 (not shown in Fig.4) from being
10 removed from the lock 40. Once a hose 30 has been attached to the inlet 36, the bolt member 45 is depressed against the action of a compression spring 47 and the lock 40 is thus free to rotate and unlock the key 43. On turning the key 43 further, the hose
15 30 is locked onto the stand-pipe 36 by the locking member 44.

The key 43 is now released from the lock 40 and the key 43 is then moved from the stand-pipe 34 to the valve 10 of the tanker compartment and is then used to
20 unlock the valve lock 24 so as to permit the fuel in the tanker compartment to be discharged via the valve 10. The key 43 is unique to the type of fuel required by the stand-pipe 34 and associated storage vessel and will thus only open the valve lock 24 if it
25 corresponds to the unique key access hole 22 of the annular plate 18 adjacent the aperture 20 of the

annular plate 12, which access hole is unique to the
type of fuel. Since the appropriate unique key access
hole 22 is aligned with the aperture 20 while the
tanker compartment is supplied with fuel, the valve
5 will be unlocked only if the appropriate corresponding
key is released from the appropriate corresponding
locking fixture of the appropriate corresponding
stand-pipe 34. Fuel contained in the tanker
compartment may thus only be discharged once the valve
10 is connected to the correct destination having
regard to the fuel desired to be supplied thereto.

The invention is not restricted to the details of
the foregoing embodiment. For example, a locking
means may be provided so as to lock the annular plate
15 18 relative to the annular plate 12. In another
modification the key may be connected to a wire loop
which passes around the hose 30 so that the key has to
be passed along the hose to enable it to be inserted
in the valve 10. In a further embodiment, carriage
20 means may be provided with the key so as to enhance
the movement of the key along the length of the hose
connecting the tanker compartment with the stand-pipe.

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CLAIMS

1. Liquid discharge selection apparatus comprising means for selectively controlling the passage of liquid from a source to a destination,
5 which means is associated with a destination peculiar to one type of liquid, whereby the passage of the liquid may be prevented when the source is connected to an unsuitable destination having regard to the type of liquid at the source.
- 10 2. Apparatus as claimed in claim 1, wherein said means is adapted to be adjusted having regard to the type of liquid at the source.
3. Apparatus as claimed in claim 2, wherein the adjustment of said means is adapted to be made at the
15 same time as the corresponding particular type of liquid is supplied to the source.
4. Apparatus as claimed in claim 1, 2 or 3, wherein said means is constructed such that it may only be operated once a connection is made between the
20 liquid source and destination and then only once the correct source is connected to the correct destination, having regard to the type of liquid to be discharged.
5. Apparatus as claimed in claim 4, wherein the
25 liquid source comprises a valve, through which the liquid is discharged as required, which valve is

opened and closed by a lock means and corresponding activator means.

6. Apparatus as claimed in claim 5, wherein said activator means is located at the destination and may
5 not be connected to the lock means, so as to open the valve, until the correct source is connected to the correct destination having regard to the liquid to be discharged therein.

7. Apparatus as claimed in claim 6, wherein
10 different lock means are provided having regard to different types of fluid, each of which lock means may only be accessed when a corresponding liquid is at the source.

8. Apparatus as claimed in claim 7, wherein the
15 activator means which is unique to the lock means corresponding to one type of liquid, comprises a key means which is locked at the destination and may not be removed therefrom until the source is connected to the destination.

20 9. Apparatus as claimed in claim 8, wherein when the key is moved so as to open the lock means it remains secured relative to the hose or pipeline making the connection between source and destination.

10. Apparatus as claimed in claim 2, wherein said
25 means comprises:

an outlet valve on the liquid source;

a locking means which enables the outlet valve to be opened only by presentation to the locking means of a key corresponding to a liquid associated with that source;

- 5 a pair of control plates disposed around said outlet valve, one plate being fixed relative to the locking means and the other being rotatable;

a first aperture in said fixed plate, aligned with said locking means;

- 10 a plurality of different keyways in said rotatable plate, positioned so as to be selectively alignable with the locking means in dependence upon the rotary position of that plate and with said first aperture in said fixed plate;

- 15 a plurality of second apertures in said fixed plate; and

an aperture in said rotatable plate which is alignable with one of said second apertures in said fixed plate to allow the fitting of a loading means to
20 the valve only when the rotatable plate has been rotated to bring an appropriate keyway, corresponding to an appropriate liquid to be loaded/dispensed, into alignment with the locking means.

11. Apparatus as claimed in claim 10, wherein the
25 rotatable plate carries a plurality of visual markings adapted to be visible through an opening in the fixed

plate to identify the particular liquid associated
with the keyway currently opposite the locking means.

12. Liquid discharge selection apparatus,
substantially as hereinbefore described with reference
5 to and as illustrated in the accompanying drawings.

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